Trend Study 24-10-97

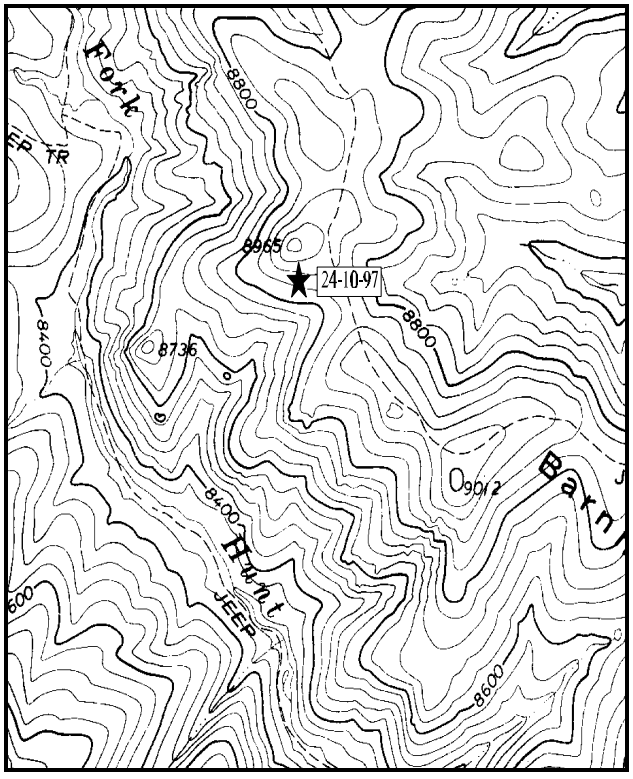
Study site name: Barnhurst Ridge . Range type: Mixed Mountain Brush .

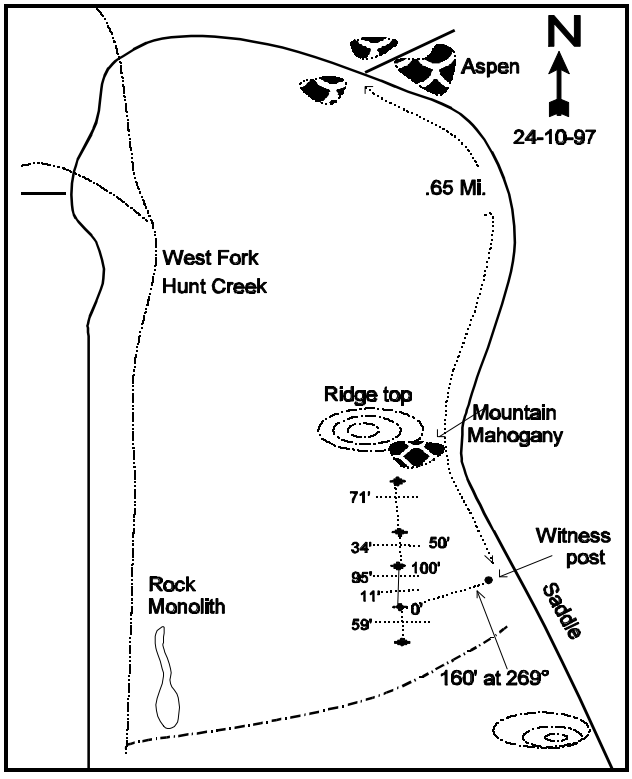
Compass bearing: frequency baseline 160 degrees.

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34 ft), line 3 (71ft), line 4 (59ft).

LOCATION DESCRIPTION

Go west off of SR 22 south of Widstoe Junction on the Tom Best Spring-Flake Mountain graveled road. Proceed 9.5 miles west on this road to the Showalter Creek intersection (6.5 mi. from Tom Best Spring turnoff on Highway 12 to Showalter Creek). Turn right and go 1 mile. Turn right towards West Hunt Creek. Go up 0.6 miles to a cattleguard. Continue 0.9 miles to a fork, keep left. Follow along the creek for 2.35 miles, then cross creek. Go 0.8 miles and cross back to south side of creek. Continue up the main canyon 0.95 miles to a fork and "Primitive Road" sign. Continue straight down into creek (left fork goes to Hancock Creek). Drive through the creek, then out and up 0.5 miles to a fork above the draw on the north side of Hunt Creek. Bear right at this fork and proceed 0.65 miles to a witness post on the right side of the road below a clump of mountain mahogany and before the saddle. The transect samples the slope on the west side of the road, starting with the 0-foot baseline stake 160 feet bearing 269 degrees from the witness post. This short fencepost is tagged #7840.





Map Name: Flake Mountain West Diagrammatic Sketch

Township 34S , Range 4W , Section unsurveyed UTM 4190009.053 N, 384056.446 E

DISCUSSION

Herd Unit 24-10 (50-10)

The Barnhurst Ridge study is located on Barnhurst Ridge at an elevation of 8,880 feet. This is a key area for elk use year-round. Quadrat frequency of deer and elk pellet groups are relatively similar at 10% and 12% respectively in 1997. The terrain is steep and the south slopes can be used during the winter where curlleaf mountain mahogany, serviceberry, mountain big sagebrush, and bitterbrush are found. A variety of grasses are also available on the basically snow-free slopes. The north-facing slopes are dramatically different, providing habitat suitable for elk during the summer months. Here aspen and conifers prevail, and adequate forage production is provided by grasses and forbs in the aspen understory. This site is positioned near the top of a southwest facing slope of 28% which appears steeper than it is. The site runs from Barnhurst Ridge to the West Fork of Hunt Creek.

The soil is a medium textured sandy clay loam that is moderately shallow and rocky. Effective rooting depth (see methods) is estimated at 10 inches. However, fractured bedrock must be accommodating the deeper rooted antelope bitterbrush and curlleaf mountain mahogany. The percent ground cover provided by rock and pavement is considerable, currently at 42%. There is evidence of overland flow of runoff, but erosion is minimal due to the high amounts of rock on the surface.

The key browse species are mountain big sagebrush, antelope bitterbrush, and curlleaf mountain mahogany. These species contribute respectively 53%, 27% and 7% of the overall browse cover. All are important sources of forage when herbaceous species are unavailable. Bitterbrush density has steadily declined since 1987 when 3,200 plants/acre were estimated. In 1991, the population declined 13% and percent decadence increased from 0 to 21%. The larger sample used in 1997 estimates 1,080 plants/acre of which 89% are mature. With no dead plants in the population, this decrease is a by-product of the much larger sample size giving more accurate estimates of species with discontinuous distributions. There were no seedlings and only 120 young plants/acre estimated in 1997. Utilization of this preferred shrub has remained moderate to heavy since 1987.

Mountain big sagebrush appears to have a slightly declining population. Density declined 24% between 1987 and 1991, then 28% between 1991 and 1997. Use of the sagebrush was moderate to heavy on 55% of the plants in 1987, but more moderate in 1991 and 1997. Poor vigor and an increase in decadence were noted in 1991, yet they have since declined to similar levels of 1987. The current population appears to continue to decline as indicated by the percentage of decadent plants classified as dying has continued to increase to its highest value since 1987 at 44%. The number of seedlings and percent young age class do not appear to be capable of maintaining the population at its current level.

Curlleaf mountain mahogany is composed of a small and increasingly mature population. Average mature plants measure just under four feet in height. Use has been light to moderate, although the population has a steadily declining number of seedlings and young, it is not critical for a very long-lived species. The decrease in the estimated population is more reflective of a much larger sample giving better estimates, rather than any real losses for there are no dead plants in the population.

The herbaceous understory is lacking on this site. Seven perennial grass species produce just under 7% cover. Forbs are extremely rare. The most abundant grasses include mutton bluegrass and letterman needlegrass. Combined, they produce 74% of the grass cover. Western wheatgrass, blue grama, and squirreltail are also fairly common. It appears that Sandberg and mutton bluegrass were combined and called Sandberg bluegrass in 1987 and 1991. Barnhurst ridge is located in the West Hunt Pasture, which is part of a five pasture deferred rotation grazing system. Barnhurst ridge grazing is deferred until grass seed have matured each year. Past use by sheep probably accounts for the lack of forbs relative to grasses on the site.

1991 TREND ASSESSMENT

Vegetative basal cover has decreased from 12% down to 7%. There has also been some decreases in rock cover, compensated by increases in percent pavement. Most importantly, percent bare ground has more than doubled to 12%. Trend for soil is slightly downward at this time. The three major browse species, mountain big sagebrush, antelope bitterbrush, and curlleaf mountain mahogany, all have noted decreases in their respective populations of 24%, 13%, and 22%. Percent decadency has also gone up for sagebrush and bitterbrush. Trend for the key species is slightly downward. Most of the grasses on the site are small and not very productive but sum of nested frequency for grasses has remained similar. The forb diversity is good, but none occur in very high frequencies. Trend for the herbaceous understory is stable.

TREND ASSESSMENT
soil - slightly downward
browse - slightly downward
herbaceous understory - stable

1997 TREND ASSESSMENT

Trend for soil is currently stable. Percent bare ground declined slightly but litter cover also declined and pavement cover increased. Trend for key browse is considered slightly down with densities of the three key species declining since 1991. The change in density of sagebrush and bitterbrush comes primarily from the young and decadent age classes. Mountain big sagebrush, which makes up the majority of the key browse, is experiencing further declines in its population. This is illustrated by inspection of the percentage of decadent plants that are classified as dying, this has steadily increased since 1987. Currently, it is at its highest value of 44%. Eighteen percent of the population is dead, this will likely increase to about 25% in the future. Trend for the herbaceous understory is slightly down. Sum of nested frequency of grasses has declined slightly with a significant decline in western wheatgrass, bottlebrush squirreltail and the combined frequency of Sandberg and mutton bluegrass. Forbs are still depleted.

TREND ASSESSMENT
soil - stable
browse - slightly down
herbaceous understory - slightly down and depleted

HERBACEOUS TRENDS --
Herd unit 24 , Study no: 10

Type	Species	Nested Frequency '87	'91	'97	Quadrat Frequency '87	'91	'97	Average Cover % '97
G	Agropyron smithii	$_{ab}$15	$_{a}$8	$_{b}$29	6	4	13	.73
G	Bouteloua gracilis	52	53	34	22	19	12	.37
G	Bromus tectorum (a)	-	-	1	-	-	1	.00
G	Festuca ovina	-	4	4	-	2	1	.03
G	Poa fendleriana	$_{a}$-	$_{a}$-	$_{b}$134	-	-	54	3.25
G	Poa secunda	$_{b}$217	$_{b}$227	$_{a}$22	85	88	11	.13
G	Sitanion hystrix	$_{b}$107	$_{b}$96	$_{a}$35	54	44	19	.43
G	Stipa lettermani	$_{a}$3	$_{a}$-	$_{b}$33	1	-	11	1.77
Total for Grasses		394	388	292	168	157	122	6.74
F	Agoseris glauca	-	2	-	-	1	-	.00
F	Arabis spp.	5	4	-	2	1	-	-
F	Astragalus utahensis	3	8	1	2	4	1	.00
F	Chaenactis douglasii	3	1	1	3	1	1	.00
F	Cirsium spp.	-	-	3	-	-	2	.01
F	Collinsia parviflora (a)	-	-	3	-	-	1	.00
F	Crepis acuminata	-	4	-	-	2	-	-
F	Cruciferae	-	1	-	-	1	-	-
F	Gayophytum ramosissimum (a)	-	-	17	-	-	8	.04
F	Gilia spp. (a)	-	-	9	-	-	4	.04
F	Hymenoxys richardsonii	1	3	-	1	1	-	-
F	Petradoria pumila	-	1	-	-	1	-	.03
F	Senecio multilobatus	3	1	-	1	1	-	.00
F	Trifolium spp.	1	-	-	1	-	-	-
Total for Forbs		16	25	34	10	13	17	0.15

BROWSE TRENDS --
Herd unit 24 , Study no: 10

Type	Species	Strip Frequency '97	Average Cover % '97
B	Artemisia frigida	1	.03
B	Artemisia tridentata vaseyana	79	13.60
B	Cercocarpus ledifolius	7	1.85
B	Chrysothamnus nauseosus albicaulis	0	.00
B	Chrysothamnus parryi	2	.15
B	Chrysothamnus viscidiflorus viscidiflorus	2	.06
B	Eriogonum microthecum	1	-
B	Gutierrezia sarothrae	14	.18
B	Pinus edulis	1	1.85
B	Purshia tridentata	39	7.05
B	Symphoricarpos oreophilus	8	1.08
Total for Browse			25.88

CANOPY COVER --
Herd unit 24 , Study no: 10

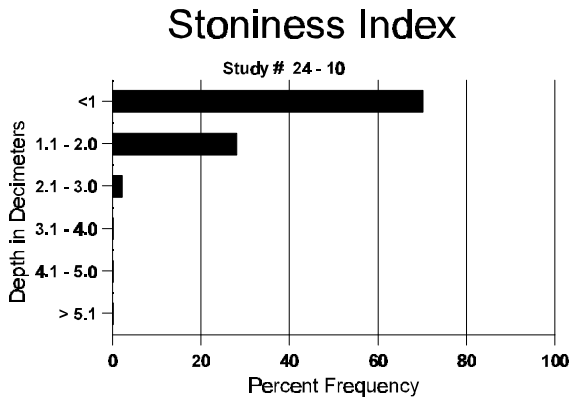
Species	Percent Cover '97
Cercocarpus ledifolius	4
Pinus edulis	3

BASIC COVER --
Herd unit 24 , Study no: 10

Cover Type	Nested Frequency '97	Average Cover % '87	'91	'97
Vegetation	261	12.25	6.50	32.37
Rock	286	24.25	18.25	17.65
Pavement	314	13.25	15.75	24.24
Litter	373	44.50	47.25	30.19
Cryptogams	10	.50	0	.08
Bare Ground	213	5.25	12.25	7.72

SOIL ANALYSIS DATA --
Herd Unit 24, Study no: 10

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
10.0	49.8 (11.7)	6.6	52.7	25.7	21.6	2.8	11.2	307.2	.4



PELLET GROUP FREQUENCY --
Herd unit 24 , Study no: 10

Type	Quadrat Frequency '97
Rabbit	10
Elk	12
Deer	10

BROWSE CHARACTERISTICS --
Herd unit 24 , Study no: 10

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia frigida																		
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	11	7	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	None
'91	00%	00%	00%	Appeared
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	-
	'91	0		-
	'97	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	87	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
Y	87	14	2	-	-	-	-	-	-	-	16	-	-	-	1066			16
	91	3	3	-	-	-	-	1	-	-	7	-	-	-	466			7
	97	25	-	-	-	-	-	-	-	-	25	-	-	-	500			25
M	87	20	27	8	-	-	-	-	-	-	55	-	-	-	3666	20	23	55
	91	22	9	1	3	-	-	-	-	-	31	1	3	-	2333	23	24	35
	97	77	26	-	-	-	-	-	-	-	102	1	-	-	2060	23	45	103
D	87	6	7	5	-	-	-	-	-	-	17	-	-	1	1200			18
	91	17	7	-	2	-	-	-	-	-	12	-	3	11	1733			26
	97	29	6	-	1	-	-	-	-	-	19	-	1	16	720			36
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	720			36

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	40%	15%	01%	-24%
'91	28%	01%	25%	-28%
'97	20%	00%	10%	

Total Plants/Acre (excluding Dead & Seedlings)				
'87	5932	Dec:		20%
'91	4532			38%
'97	3280			22%

Cercocarpus ledifolius																		
S	87	20	-	-	-	-	-	-	-	-	20	-	-	-	1333			20
	91	2	-	-	1	-	-	3	-	-	6	-	-	-	400			6
	97	-	-	-	2	-	-	-	-	-	2	-	-	-	40			2
Y	87	18	-	-	-	-	-	-	-	-	18	-	-	-	1200			18
	91	3	2	-	6	-	-	3	-	-	14	-	-	-	933			14
	97	-	1	-	2	-	-	-	-	-	3	-	-	-	60			3
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	4	2	-	-	-	-	-	1	-	7	-	-	-	140	45	59	7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	-22%
'91	14%	00%	00%	-79%
'97	30%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'87	1200	Dec:		-
'91	933			-
'97	200			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus nauseosus albicaulis																		
M	87	1	-	-	-	-	-	-	-	-	1	-	-	-	66	12	7	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	10	21	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	Died out
'91	00%	00%	00%	None
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'87	66	Dec:		-
'91	0			-
'97	0			-

Chrysothamnus parryi																		
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40	9	17	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	None
'91	00%	00%	00%	Appeared
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'87	0	Dec:		-
'91	0			-
'97	40			-

Chrysothamnus viscidiflorus viscidiflorus																		
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	8	10	1
	97	1	-	-	1	-	-	-	-	-	2	-	-	-	40	-	-	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	Appeared
'91	00%	00%	00%	-39%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'87	0	Dec:		-
'91	66			-
'97	40			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Eriogonum microthecum																		
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	2	-	-	-	-	-	2	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	None
'91	00%	00%	00%	Appeared
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	-
	'91	0		-
	'97	40		-

Gutierrezia sarothrae																		
S	87	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	87	9	-	-	-	-	-	-	-	-	9	-	-	-	600			9
	91	7	-	-	-	-	-	-	-	-	7	-	-	-	466			7
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	87	28	-	-	-	-	-	-	-	-	28	-	-	-	1866	9	7	28
	91	8	-	-	1	-	-	-	-	-	9	-	-	-	600	7	7	9
	97	17	-	-	-	-	-	-	-	-	17	-	-	-	340	8	10	17
D	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	2	-	-	-	-	-	-	-	-	1	-	-	1	133			2
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	-51%
'91	00%	00%	06%	-72%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	2466	Dec:	0%
	'91	1199		11%
	'97	340		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Mahonia repens																		
Y	87	2	-	-	-	-	-	-	-	-	1	1	-	-	133			2
	91	-	-	-	1	-	-	1	-	-	2	-	-	-	133			2
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	87	1	-	-	-	-	-	-	-	-	1	-	-	-	66	6	3	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	-33%
'91	00%	00%	00%	Died out
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	199	Dec:	-
	'91	133		-
	'97	0		-

Opuntia spp.																		
Y	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	87	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4	9	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	+ 0%
'91	00%	00%	00%	Died out
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	66	Dec:	-
	'91	66		-
	'97	0		-

Pinus edulis																		
M	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	00%	00%	00%	None
'91	00%	00%	00%	Appeared
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	0	Dec:	-
	'91	0		-
	'97	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
S	87	9	-	-	-	-	-	-	-	-	9	-	-	-	600			9
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	87	10	5	-	-	-	-	-	-	-	15	-	-	-	1000			15
	91	6	2	1	3	2	-	2	-	-	16	-	-	-	1066			16
	97	4	-	-	2	-	-	-	-	-	6	-	-	-	120			6
M	87	3	18	12	-	-	-	-	-	-	33	-	-	-	2200	26	24	33
	91	-	9	3	1	1	3	-	-	-	17	-	-	-	1133	23	25	17
	97	7	24	12	3	2	-	-	-	-	48	-	-	-	960	17	42	48
D	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	5	2	-	1	-	-	-	-	7	-	2	-	600			9
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	48%	25%	00%	-13%
'91	48%	21%	05%	-61%
'97	48%	22%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	3200	Dec:	0%
	'91	2799		21%
	'97	1080		0%

Symphoricarpos oreophilus																		
S	87	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	87	1	1	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	1	-	-	1	-	-	-	-	-	2	-	-	-	133			2
	97	-	-	-	5	-	-	-	-	-	5	-	-	-	100			5
M	87	1	1	-	-	-	-	-	-	-	2	-	-	-	133	10	13	2
	91	2	2	-	1	-	-	5	-	-	10	-	-	-	666	13	9	10
	97	5	-	-	3	-	-	-	-	-	7	1	-	-	160	14	26	8

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'87	50%	00%	00%	+67%
'91	17%	00%	00%	-67%
'97	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'87	266	Dec:	-
	'91	799		-
	'97	260		-